

A pedagogical understanding of the self-determination theory in physical education

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Abstract:

Learner motivation is considered an important premise for learning achievement. One of the theories used to explain learner motivation in physical education is the Self-Determination Theory (SDT). Different from others, SDT acknowledges the controlling nature of institutionalized education and builds its application around externally imposed regulatory mechanisms to enhance learner motivation. In this article, we review research findings on SDT in physical education and reason for the use of externally regulated motivation approaches as a primary strategy in physical education. We frame our arguments in the constructivist learning theories and argue that using external regulation mechanisms to maximize learner motivation is not inconsistent with the constructivist learning theories. Our pedagogical understanding about satisfying the basic human needs for competence, relatedness, and autonomy leads us to believe that the priority should be placed on competence development with relatedness as a pedagogical platform for competence development in physical education.

Keywords: Self-Determination Theory (SDT) | physical education | learner motivation

Article:

Dramatic changes have taken place in physical education. As Chen and Ennis (2009) have noted in their literature review, physical education as a school subject has transformed its content from exclusively sport-centered to health-related with a hope that the content will enhance future citizens' quality of living and quality of life. In this context of learning, students are expected to become active agents in the learning process; which requires a high level of motivation, especially self-determined motivation (Ryan & Deci, 2009).

Learner motivation in physical education has been examined extensively through multiple theoretical lenses beyond the behaviorist perspective (Chen, Chen, & Zhu, 2009). One powerful theoretical lens is the Self-Determination Theory (SDT) (Deci & Ryan, 1985). The theory, in short, postulates a path that enables educators to move the learner from a motivation state

developed, regulated, and maintained by an externally controlling agent (e.g., the teacher or classroom rules) to a motivation self-determined by students themselves. Unlike other theoretical frameworks, SDT acknowledges the controlling nature of institutionalized schooling and proposes to use strategies consistent with this nature to promote the fundamental human needs for autonomy, competence, and relatedness as motivation agents (Deci & Ryan, 2002). This acknowledgment leads to a realization that initial learner motivation in schooling may need to be regulated by external forces such as classroom rules and teacher-imposed incentives or punishments. With the value of education instilled, students become motivated through valuing what is being learned in relation to their lives. Gradually, they can become intrinsically motivated for the activities they are engaged in during the learning process.

SDT was developed as a general psychology theory to explain human behavior. Research on its application in physical education is still in its infancy. To fully use SDT in physical education requires a pedagogical understanding that allows curriculum developers and teachers to maximize its potential and minimize its limitation. It is the purpose of this article to articulate the theory through a pedagogical perspective. Through reviewing research-based evidence, we intend to (a) explore tangible pedagogical advantages and limitations of SDT in motivating physical education learners, (b) articulate its implications to regulating learner motivation and behavior by situating SDT in the physical education instructional context, (c) probe SDT research findings based on the social constructivist perspective for a better understanding of SDT in relation to learning, and (d) appraise and critique SDT research findings in terms of curricular implications. During this articulation process, we delimit our effort in K–12 physical education.

The rationale for this articulation lies in our recognition of the SDT's simultaneous appreciation of the importance of the controlling agency in schooling and individual students' needs to become self-motivated (autonomous) to be successful in schooling and in life (Deci & Ryan, 2002). The controlling agency often is manifested in the curriculum, teacher behavior, school regulations and rules, and, last but not least the assessment system. All these demand students to behave in certain ways to be successful in school. The learner, on the other hand, is expected to become physically educated who will be able to *motivate herself*, hopefully without an external controlling agent, to engage in physical activities that enhance the quality of living and quality of life. The potential of applying SDT in physical education can be profound in that it presents a possible path for physical educators to lead students from a psychological state of “having to” to one of “wanting to” based on which a physically active life style can be developed.

Our articulations in this article are based on the following assumptions. First, we assume physical education is a learning oriented, educational program. Its primary goal is to educate children and adolescents to become physically fit and skillful with profound kinesiological knowledge for a healthful life. Second, we assume that an over-arching characteristic of school is to control, either overtly or covertly. School administrators and teachers are controlling agents and students are controlled. Although many physical education programs and teachers are giving students many choices to promote learner autonomy, limitations of this effort lie in the fact that teachers and the school are still in control of many aspects of student learning. Third, we assume that the learning process is socially constructed where learning is based on student-teacher and student-student interaction in class. In this process, “teachers and students share ownership of knowing and students gain a sense of self-determination” (Oldfather, West, White, & Wilmarth,

1999, p. 90). The motivation process is also influenced constantly by the teacher and peer students. For example, motivation based on perceived competence can be decreased by negative feedback from the teacher. Fourth, based on the previous assumptions, we assume that effective (or useful) motivation should be “linked explicitly to ways of knowing, understanding, and constructing meaning” (Oldfather & Dahl, 1994, p.139). Motivation can be deemed of little meaning in education if the explicit link has not been established. Specifically, teachers need to focus their efforts on motivating students to “find their passions, discover what they care about, create their own learning agendas, and most importantly, connect who they are to what they do in school” (Oldfather et al., 1999, p. 15).

We organize our articulation in the following sections. We begin with a description of SDT and its theoretical components. The components include the basic needs of the learner, the states of motivation, and the self-regulations. Then, we explore the pedagogical significance in each of the components. Lastly, we present our understanding on ramifications of applying SDT in curriculum design and instruction of physical education.

Overview of the Self-Determination Theory

SDT is a theory that explains human’s motivation by focusing on the importance of human’s inner needs for development and behavioral regulation associated with external control (Ryan & Deci, 2000a). SDT basically postulates that the desire to satisfy one’s innate needs is the fundamental motive for human behavior; but the motivation cannot be taken for granted because the environmental factors can either encourage or thwart the innate tendency to act to satisfy the needs (Deci & Ryan, 2002).

Basic Human Needs

According to Deci and Ryan (1985), there are three fundamental human innate needs, competence, autonomy, and relatedness. In SDT, human needs refer to “innate psychological nutrients that are essential for ongoing psychological growth, integrity, and well-being” (Deci & Ryan, 2000, p. 229). These needs set human motivation apart from those that are shared by human beings and other living species, such as the needs for food, shelter. Specifically, *Competence* refers to being effective in ongoing activities that one engages in. The more competent a person perceives him/herself in an activity, the more intrinsically motivated one will be at that activity (Deci & Ryan, 1985). *Autonomy* is the degree to which an individual perceives her/himself as the origin or source of a behavior and as being responsible for the initiation of the behavior (Deci & Ryan, 2002). An autonomous individual regulates his/her own behavior by governing the initiation and direction of actions (Ryan & Powelson, 1991). *Relatedness* is defined as the extent to which an individual feels connected to others and the senses of belongingness to the community.

Motivation States and Regulation Processes

Deci and Ryan (e.g., 1985, 2000) conceptualized motivation as a process in which an individual self-determines his/her current needs and self-regulates his/her action to meet the needs. Human beings are often in one or more states of motivation, namely: amotivation, extrinsic motivation,

and intrinsic motivation. *Amotivation* is defined as a state in which an individual is neither intrinsically nor extrinsically motivated. It often occurs when the individual does not value an activity or behavior does not anticipate relevant outcomes from it, or does not feel competent to perform it (Ryan & Deci, 2000b). *Extrinsic motivation* refers to a motivation state that is regulated by external contingencies such as rewards or punishments for an individual to perform an activity/behavior to attain expected outcomes (Ryan & Deci, 2000b). *Intrinsic motivation* is defined as a state of motivation that drives an individual to engage in an activity for the activity's inherent interest or enjoyment rather than for attaining external contingencies (Ryan & Deci, 2000a).

A core focus of SDT is on understanding and utilizing externally imposed processes that regulate extrinsic motivation. The regulation processes are characterized by regulatory styles that lead to corresponding motivation to satisfy an individual's various needs at the moment in a given environment, such as a classroom. The regulations include *external regulation*, *introjected regulation*, *identified regulation*, and *integrated regulation*. In SDT they are arranged in a continuum to indicate different types of extrinsic motivation. It is hoped that through these regulatory processes, an individual will move from a motivation state to another toward to the intrinsic motivation. We will elaborate these components in detail below in association with our pedagogical understandings.

Pedagogical Understanding of the Needs

In the past two decades, the constructivist learning theories have been accepted by educational researchers to explain the process of learning. For example, Piaget's theory explains that learning takes place only when the child is allowed to actively explore the environment as his/her own learning agent. Thus, the need for *autonomy* is guiding the act of learning and is satisfied as a motivation outcome associated with accomplishing a learning goal. On the other hand, Vygotsky's social-constructivist theory argues that learning may not be accomplished if the learner merely acts as a lone scientist (Dahlberg, Moss, & Pence, 1999). Rather learning takes place when the child acts as a *member* of a learning community interacting with knowledgeable others—teachers and peers (Vygotsky, 1978). In other words, the need for *relatedness* serves as a premise for meaningful learning.

These propositions of the constructivist learning theories are consistent with the SDT articulation on reasons why one can be motivated in an achievement setting: for satisfying the needs of competence, autonomy, and relatedness (Deci & Ryan, 1985). Ryan and Deci (2000b) argued that although self-determination motivation is an individual-centered process, its development depends on a supportive social environment, especially for school-age children. Based on this theoretical postulation, a number of studies have been conducted to examine how a student's experience of competence, relatedness, and autonomy can be affected by the social context, and subsequently can influence motivation development and performance on achievement tasks (e.g., Black & Deci, 2000; Miserandino, 1996; Reeve, Nix, & Hamm, 2003; Ryan & Connell, 1989; Williams & Deci, 1996).

In physical education, Carson and Chase (2009) extended the current literature to include physical education teachers in their study, using SDT as a guiding framework. Congruent with

the previous studies examining the relationship between physical education students' perceived need satisfaction and types of motivation, Carson and Chase (2009) found that physical educators' self-determined motivation were strongly and positively related to their perceived fulfillment of autonomy, relatedness, and competence needs. In addition, their results revealed that physical educators who felt autonomous, competent, and connected to others at work were intrinsically motivated to teach physical education. The findings of this study are of particular importance as physical education teachers play a critical role in facilitating students' innate needs and motivation.

Autonomy

Research has demonstrated that satisfying this need can have positive impact on the variables important to learning achievement. An autonomy-supportive environment provides students with choices and opportunities for self-direction (Shen, McCaughtry, Martin, & Fahlman, 2009) and positive informational feedback and a context in which the students' opinion is considered (Ryan & Deci, 2000b). An autonomy-supportive teacher would create an environment with a minimal amount of pressured evaluations, imposed goals, and demands and provide students with necessary information while encouraging them to use the information to solve a problem in their own way (Shen et al., 2009). In a quasi-experimental study, Black and Deci (2000) examined the hypotheses that autonomy-support would lead to greater perceived competence, less course-related anxiety and grade orientation, and more self-determined motivation. In the study, the researchers trained college student group leaders on supporting others' autonomy in group discussions. The leaders then were asked to lead peer students ($n = 137$) randomly assigned to them to solve problems in organic chemistry over a semester. Results from the regression analysis revealed that autonomy support from the group leaders explained significant increases in self-determined motivation in learning. In addition, the autonomy support explained significant increases in students' perceived competence, interest/enjoyment in learning, and significant decrease in course-related anxiety. Furthermore, the findings indicated that students who perceived more autonomy support from their leaders performed better in the course.

Shen, McCaughtry, Martin, and Fahlman (2009) investigated the effects of teacher's autonomy support on students' self-determined motivation, learning achievement, and cardio-respiratory fitness with 253 urban adolescents in physical education. A 4-month personal conditioning unit was designed to enhance students' cardio-respiratory fitness knowledge and cardio-respiratory fitness. The findings revealed that students' perceptions of teacher autonomy support predicted their self-determined motivation in physical education. Results from the regression analysis suggested that teacher's autonomy support did not predict students' cardiorespiratory fitness improvement, but it significantly predicted their knowledge achievement. Autonomy development relies on providing students opportunity to make decisions (Deci & Ryan, 2002). But, what students perceive as autonomous action and what the institutionalized schooling entails as "relevant choice" for students to experience may create a conflict that suppresses autonomous motivation (Assor, Kaplan, & Roth, 2002). There is no doubt that school is a controlling environment in which students are expected to behave in certain ways and demonstrate desired behavioral outcomes. To be successful, they are likely to develop a type of "controlled motivation" (Ryan & Deci, 2009; p. 177), which, we believe, is in obvious conflict with the development of individual autonomy.

In schools, important decisions are made by educators, including giving and taking away students' opportunities to practice autonomy. The decision making and implementation create a controlling atmosphere that is a constant in schools regardless of how much autonomy a student may experience in a classroom. The controlling nature of schooling reinforces the controlled motivation through external regulations (Ryan & Deci, 2009) and suppresses autonomous motivation that students may experience in individual lessons. The autonomous motivation students have experienced in physical education might be affected by the externally controlled environment in their school. Under the circumstances, their autonomy needs may be satisfied only at a superficial level. The superficial autonomy may not contribute to learning achievement (Kage & Namiki, 1990).

Competence

Within SDT, the need for competence is "reflected in the propensity to pursue challenges that are just beyond one's current level of functioning and through such activity to both make developmental gains and derive a sense of confidence and self-esteem." (Ryan & Powelson, 1991, p. 53). In a pedagogical sense, developing learner competence has always been a central goal for learning. As stated in the national standards [National Association for Sport and Physical Education (NASPE), 2004], physical education students are expected to achieve both competence-based goals and non-competence-based goals (Chen & Ennis, 2004). The competence-based goals include those for developing kinesiological knowledge and physical skills needed for leading a physically active life; while non-competence-based goals include those for developing positive mental dispositions and values for physical activity (Chen & Ennis, 2004). Connell (1991) indicated that competence development can be facilitated by providing pedagogical structures, such as communication of realistic expectations, consistent consequences, and competence-relevant feedback from the teacher or peers.

While competence development leads to enhanced learner motivation and outcomes, experiencing a lack of fulfillment of the need for competence often is associated with negative motivational and behavioral outcomes. For instance, Miserandino (1996) reported that a group of students with above-average SAT scores demonstrated negative affect and withdrawal behaviors as well as a decline in performance when their need for competence was perceived as unfulfilled. The students reported less involvement in and persistence on tasks, stronger feeling of boredom, and lack of curiosity. In contrast, students whose need for competence was met in a positive social context were able to adjust to and hold positive beliefs about their own competence, and were able to improve their grades over the school year.

The social constructivist learning theory uses Vygotsky's concept of the Zone of Proximal Development (ZPD) as an indicator to gauge learning achievement and learning itself. The concept suggests that learning starts when the learner becomes aware of the distance between what he/she knows currently and what he/she is expected (or wants) to know further. With achievement, a new ZPD is defined in terms of where the need for the next level of knowledge and skills is understood. This recursive, cyclic process perpetuates for continued learning that requires using advanced social skills, such as seeking help from knowledgeable others. Based on research evidence emphasizing the importance of providing positive competence information to

learners, Rink (2009) advised physical education teachers as to design practices that would allow a greater possibility of success to develop students' positive perception of their competence. In several curriculum models, for instance Fitness for Life (Corbin, Le Masurier, & Lambdin, 2007) or Games for Understanding (Mitchell, Oslin, & Griffin, 2006), modifying learning tasks to promote positive perceptions of competence has become a common strategy seen in almost every lesson.

Although pedagogically helping students satisfy the need of becoming competent has been part of teaching practices for a long time, recent longitudinal data showed a steady decrease of perceived competence in K–12 students in many subject matter areas including sport (Jacobs et al., 2002). The same downward pattern has been observed in physical education as well (Xiang, McBride, & Guan, 2004; Xiang, McBride, Guan, & Solmon, 2003). A more recent study (Zhu, Chen & Sun, 2008) on the association between students' expectancy beliefs and learning achievement in physical education showed little or no connection between perceived competence and knowledge and skill achievement. But learner perceived competence had an indirect positive impact, through the development of skills (actual competence), on middle school students' after school physical activity participation. The findings indicate perceived competence may have limited impact on learning. When supported by actual competence, perceived competence can impact after-school physical activity behavior.

Relatedness

The need for feeling connected to others and feeling capable and worthy of love and respect from others is considered the need for relatedness (Connell & Wellborn, 1991). The sense of relatedness develops from the involvement of others through communication of interest in and enjoyment of the activities where a group of individuals share common experiences (Connell, 1991; Connell & Wellborn, 1991). In an education context, the need for relatedness helps in the process of cultural transmission and internalization of values often observed between parents and children, teachers and students, and students and students (Ryan & Powelson, 1991). Research on the relatedness has demonstrated that students' interaction and relationship with their parents, teachers, and peers are related to their school adjustment including academic performance, motivation, and interest (e.g., Feldman & Wentzel, 1990; Wentzel, 1999; Wentzel, 2002; Wentzel & Watkins, 2002).

Wentzel (1997) examined the role of perceived caring from teachers in eighth grade students' motivation ($n = 375$) in a suburban middle school. The results showed that students' perception of their teachers' pedagogical caring was a weak but significant predictor for students' pursuit of social goals ($R^2 = .09$) and academic effort ($R^2 = .07$). In addition, peer relations were also found to be associated with academic achievement. Wentzel (2002) found that students who perceived their peers as being supportive and caring were more likely to engage in positive aspect of school life, to pursue academic and social goals, and to earn higher grades than students who did not perceive such positive peer relationship.

Based on the social-constructivist pedagogy, developing sound relations with others, especially knowledgeable others, is viewed as crucial as learning itself (Vygotsky, 1978). During the learning process, an individual's ZPD is satisfied through internalizing knowledge acquired

through communicating with the others in the community of learning (e.g., a class, school, with a teacher). Consistently, SDT and the social constructivist theory seem to suggest that relatedness is a need to be satisfied in the learning process as well as a premise for effective learning. It serves as a platform for learning achievement. Thus, a pedagogy incorporating little shared experiences for relatedness may not be effective in enhancing achievement, especially in institutionalized schooling (Fleer & Richardson, 2009; John-Steiner & Mahn, 1996).

Summary

Children's needs of autonomy, competence, and relatedness are considered both the goals of children's self-motivation and the pedagogical sources of motivation. Satisfying the needs can be a strong motivator for students to achieve in school or other endeavors. Pedagogically supporting the needs can be a challenging task for teachers in institutionalized education settings where controlling is central to the teaching—learning process. It seems that controlled motivation is a primary form of motivation that teachers may use in association with students' desire for satisfying the needs through achieving academically. Thus, pedagogical significance of SDT is realized through a thorough understanding of the various states (forms) of externally regulated motivation that facilitates learning. Realistically, the needs may not be equally satisfied in physical education. The conflict between autonomy development and the controlling nature of schooling serves as an example reminding us of a need to reexamine the usefulness of the externally regulated motivation, or extrinsic motivation (Cameron & Pierce, 1994). In the following sections, we continue with an exploration of the pedagogical understanding of the regulation processes in SDT.

Pedagogical Understanding of the Motivation States

In SDT, motivation can be understood in three basic states, amotivation, intrinsic motivation, and extrinsic motivation. The absence of motivation is named *amotivation*, referring to situations where an individual lacks the intention to act (Ryan & Deci, 2000a). Amotivation occurs when the individual feels incompetent or helpless to do an activity, does not value the activity or not expect the activity to yield a desired outcome, or feels lack of control in an environment (Deci & Ryan, 1985; Ryan & Deci, 2000b). With amotivation, an individual either does not take part in the activity at all or just goes through the motion without an intent to achieve (Ryan & Deci, 2000b).

Intrinsic motivation is considered the fuel for action to satisfy one's innate needs (Grolnick, Gurland, Jacob, & Decourcey, 2001). Intrinsic motivation is characterized by the individual engaging in the activity for the sake of the activity itself and for the satisfaction inherent in performing the activity. It often derives from a person-activity interaction in the activity that the individual finds interesting, optimally challenging, or aesthetically pleasing (Deci & Ryan, 2002). In life, intrinsic motivation energizes a wide variety of behaviors that reward the individual with experience of autonomy, competence, and relatedness in the activity. Therefore, intrinsic motivation resides in people's satisfaction of the needs of autonomy, competence, and relatedness (Deci & Ryan, 1985; Ryan & Deci, 2000b).

The motivation initiated by reasons other than the activity itself is often referred to as *extrinsic motivation*. In reality, people usually *have to* be motivated extrinsically because not all human activities are intrinsically interesting, equally challenging, or intrinsically pleasing for everyone. Many activities or tasks in school and the contemporary society are likely lacking intrinsic motivation characteristics, but they are deemed necessary for people to engage in. Take running for example, it may not be an enjoyable activity for everyone. But it is a worthwhile activity for improving and maintaining health. Thus people often *need* to be motivated through the means other than interest, challenge, and pleasant experiences. From this perspective, SDT concerns how nonintrinsically motivated individuals acquire the motivation to carry out activities necessary for them at the current stage of life and how extrinsic motivation affects ongoing activities and is internalized (transformed) in association with the innate needs (Ryan & Deci, 2000a).

Pedagogical Implications

From a pedagogical perspective, learner amotivation is sometimes assumed by the teacher because the learner may know little about the content; thus will have little inclination to either extrinsic or intrinsic motivation processes. Intrinsic motivation, on the other hand, may exist but with wide variations in terms of the content, activities, and learning tasks a school can offer. One learner may be motivated intrinsically by one activity because of personal interest; the motivation may be completely turned off in another due to lack of interest (Hidi & Harachiewicz, 2000). Because physical education offers very diverse physical activities as the primary content that cannot possibly match the equally diverse students' personal preferences for physical activities, intrinsic motivation from all students in physical education can be difficult to come by. Teaching students to become intrinsically motivated in this pedagogical environment can be a daunting task for physical educators.

According to SDT, intrinsic motivation derives from the activity, but resides within an individual during the person-activity interaction. An important pedagogical understanding is that the development of intrinsic motivation is dependent on regulation mechanisms and these mechanisms need to be taught to students. A dilemma worth pedagogical consideration is that, implicitly or explicitly, a dominant goal for studying physical education is heavily related to bodily-health purposes such as losing or controlling weight (an extrinsic reward) rather than for the enjoyment of exercising (a source of intrinsic motivation). Other extrinsic rewards include grades, teacher praise, or avoidance of negative academic consequences. These and other extrinsic rewards we build in the institutionalized physical education experiences make it quite possible that the motivation behind students' learning behavior is extrinsic and regulated by external rewards.

Function of Extrinsic Motivation

Research in educational psychology has provided inconclusive evidence about the function of extrinsic motivation. Deci, Koestner, and Ryan (1999) conceptualized extrinsic-rewards into intangible (verbal encouragement, praises) and tangible (forms of material-based reward, stickers, money, etc.) and conducted a meta-analysis on findings from 128 studies published between 1971 and 1996. They reported that overall, intangible rewards (e.g., positive verbal

feedback) enhanced intrinsic motivation, whereas tangible rewards undermine it with the exception when tangible rewards are given *unexpectedly* (without rewarder's prior knowledge) and are *disconnected* from task engagement (task–noncontingent rewards). Both tangible and intangible rewards tied to task- or performance-contingency were found detrimental to intrinsic motivation. In other words, if a learner receives a reward as a direct function of their performance on or engagement in a learning task, the possibility of being motivated by the task itself decreases when the reward is no longer available.

The finding is contradictory to Cameron and Pierce's findings from a similar meta-analysis (1994). Through analyzing 96 experimental studies and the effect sizes, Cameron and Pierce (1994) did not find detrimental effects from most external rewards on intrinsic motivation. Consistent with Deci et al. (1999) findings, Cameron and Pierce reported (1994) that positive verbal reward and unexpected tangible rewards were not detrimental to intrinsic motivation. These findings confirm that the learner receiving an unexpected tangible reward for performing well in a learning task is unlikely to become unmotivated when the reward is withdrawn. Contrary to Deci et al. (1999), Cameron and Pierce (1994) found that giving tangible rewards for performance did not have a negative effect on motivation. For example, it may not be detrimental to students' motivation if a physical education teacher posts high achievers' performance record on the gymnasium wall. The only negative effect Cameron and Pierce (1994) found was the use of expected tangible rewards for mere engagement. Thus, giving grades for merely dress-out and participation is detrimental to students' motivation for learning in physical education. Based on their analysis, Cameron and Pierce (1994) argued that a controlling environment with extrinsic rewards may not lead to maladaptive behavior with respect to intrinsic motivation.

Summary

The three states of motivation in SDT constitute critical components in a framework that helps educators identify types of students' motivation. In physical education there has been evidence that most students are motivated (Goodlad, 2000). Chen et al.'s meta-analysis (2009) on 79 motivation studies in physical education revealed that the aggregated motivation level for K–12 physical education students is above 60 on a standardized 100-point scale regardless of the theoretical constructs used in measurement. However, the motivation may not be intrinsic in nature. Our pedagogical understanding of SDT seems to suggest that intrinsic motivation may be difficult to sustain among students. We should not assume that all students are intrinsically motivated about learning everything in the physical education curriculum. In addition, the pedagogical understanding leads us to believe that intrinsic motivation in the institutionalized learning environment can only be developed with educators' deliberate conditioning. The means of the conditioning include feedback from teachers, peer students, or parents, stickers for participation in an activity, award certifications for a successful performance, and more. These and other means can have external regulatory impact on intrinsic motivation negatively or positively. Thus, it has become extremely important to understand the process of external regulations (regulations controlled by teachers or others) and their impact on learner motivation.

Pedagogical Understanding of the Extrinsic Regulation Processes

The different states of motivation reflect differing degrees to which the value of a required behavior for an activity has been internalized and integrated by the individual. Therefore, all forms of motivation regardless of sources are mental processes resulting from the individual's self-regulation. According to SDT, *self-regulation* is "the energization and guidance of behavior on the basis of integrated awareness, informed by basic needs" (Ryan & Deci, 2000c, p. 47). A self-regulated behavior, according to Ryan and Deci (2000c), represents the acceptance of an activity based on the individual's needs, values, and judgments. In a controlled environment of school, self-regulation is a process by which students integrate external values or beliefs into self-determined motivation. It is a process of internalizing and integrating what is valued in the immediate environment even though the activity is not appealing to the student and lacks substance for intrinsic motivation (e.g., Deci & Ryan, 1985; Ryan & Deci, 2000a, 2000b). We believe that given the controlling nature of institutionalized education, a pedagogical understanding of the regulation processes is crucial to effective teaching for achievement in physical education.

Extrinsically motivated behaviors do not occur spontaneously out of the characteristics of a task or activity and they require provision of external factors if they have to occur (Deci & Ryan, 1985). The role of external factors is largely to impose an externally controlled regulation to guide behavior. For example, one can use positive outcome of weight loss/control as an external regulator (reward) to motivate and guide the behavior of exercise. Deci and Ryan (1985) argued that there must be a process of internalization through which an individual gradually acquires the value or belief central to the external regulation mechanism (along with its necessary extrinsic contingencies) and transforms it into a personal belief based on which he/she regulates the behavior in the similar environment, such as in schools. Transforming an external regulation mechanism into an internal one requires a shift of personal value from the externally controlled perspective to a self-centered perspective. Take the weight loss/control example again: when one associates weight loss/control with the value of health, an externally controlled mechanism (monitoring weight constantly for a rewarding experience) will be replaced by the value of healthful living. The behavior regulation will become self-centered instead of reward-contingent.

Internalization is thought to be a constructive process that is expected to resolve the inherent conflict between autonomy (what one would do naturally) and external control (what one is being directed to do) (Deci & Ryan, 1985). This special constructive process consists of four types of behavioral regulations of extrinsic motivation—external regulation, introjected regulation, identified regulation, and integrated regulation (e.g., Deci & Ryan, 1985). Each is one step closer than the prior one to the integration of external values, which are filtered through the regulation mechanism. All steps involve a different blend of autonomy and external control. But the relations among them are not necessarily sequential; students do not have to follow a sequence from the external regulation to the integrated regulation. Below is a summary of these regulations.

External Regulation

External regulation is the most initial form of regulation that an individual adopts to satisfy an external demand or reward contingency (Ryan & Deci, 2000b). This regulation occurs when one is anticipating a certain outcome associated with a required behavior. For example, a student

participates in a running program for a T-shirt as a reward despite that the student does not like running. In this case, the behavior (participation) is regulated through extrinsic rewards (the T-shirt) and may be sustained through the student's internalization of the anticipation to receive a reward. The running behavior, thus, is regulated by the externally imposed consequence that is anticipated (Deci & Ryan, 1985). This type of regulation entirely relies on external control.

Introjected Regulation

Introjected regulation refers to partial or suboptimal internalization in which the individual endorses the necessity of a behavior, but does not fully identify with its value or regulatory process and does not accept it as his/her own (Deci, Eghrari, Patrick, & Leone, 1994). Introjectedly regulated behavior often is self-initiated but takes place under external pressure and tension, and is accompanied with great anxiety (Deci et al., 1994). Individuals adopt introjected regulation with the desired behavior because they feel they have to rather than want to. With introjected regulation, the individual conducts the behavior to avoid a sense of guilt or to attain and maintain ego (Deci & Ryan, 1985). For instance, a student participates in running to avoid a feeling of guilt for not working hard in a physical education class. Individuals who self-regulate behavior with this mechanism have established an internal version of the external contingency that may or may not provide tangible contingent rewards. Adopting introjected regulation demonstrates a degree of autonomy (Deci & Ryan, 1985).

Identified Regulation

Identified regulation is a more self-determined form of extrinsic motivation mechanism that operates on the basis of the individual identifying him/herself with the value and necessities embedded in the behavior that the mechanism regulates. The identification reflects the fact that the regulated behavior has been accepted as personally important, and this recognition becomes the source of motivation (Ryan & Deci, 2000a). An individual with identified regulation demonstrates more autonomy and self-determination as he/she has accepted the form of regulation as his/her own through identifying self with the regulation process. For example, a student participates in a running program because he/she understands and believes running to be beneficial to his/her health. Thus, strong autonomy becomes a unique characteristic of this regulation; which results in a desired behavior without the enforcement of external influences from the teacher. In addition, the student is more likely to be motivated by values in the outcome of an activity (losing weight, becoming healthy), rather than those unrelated to the values (e.g., T-shirts,). The conflict between autonomy and external control is largely dissipated and the individual experiences less pressure and more flexibility in regulating the desired behavior.

Integrated Regulation

Integrated regulation refers to optimal internalization leading to self-determined motivation and is necessary for the desired behavior that usually is controlled externally to become fully autonomous (Deci et al., 1994; William & Deci, 1996). Individuals with integrated regulation not only do what they are required to do, but also behave in accordance with external values because they have accepted those values as their own. Take running for example again, students with integrated self-regulation believe in the values of running the teacher has conveyed to them.

They not only become active runners in physical education, but also adopt the behavior in their lives outside physical education. In the integrated self-regulation, external contingencies, significant others' authority, or affective factors such as pressure, sense of guilt, or shame would not determine individuals' behavior (Deci & Ryan, 1985). Although this type of motivation shares many qualities with intrinsic motivation, it is still considered extrinsic because the purpose of the demonstrated (or regulated) behavior is to attain separable outcomes independent from the activity (such as good health, rather than interest in or enjoyment of running, if referring to the running example).

Summary

The regulation processes are the core of extrinsic motivation and, arguably, of intrinsic motivation as well. They seem to provide not only a conceptual framework for psychologists to identify the mechanisms of self-regulation, but also an operational platform for educators to provide planned experiences for students to become self-regulated learners. Although it seems that the four types of self regulation form a conceptual continuum following which an individual progressively develops self-determination for extrinsically motivated behavior, the development of self-regulated motivation does not necessarily follow this sequence. Deci and Ryan (2000) argue that individuals can readily internalize any regulation mechanism at a given moment, depending on both prior experiences and the immediate environment. We think that it is necessary for physical educators to realize the controlling nature of teaching. Regardless of the approaches, the teacher is in control of all classroom activities. The conflict between the controlling mechanisms, hidden or overt, and students' autonomy is always present in the classroom. Understanding these self-regulation processes may help the teacher develop a planned path to lead the students from the state of amotivation to integrated motivation, eventually to intrinsic motivation for physical activity.

SDT and Learning in Physical Education

Similar to many subject matter areas in school, physical education is taught in a structured environment in that students are required to demonstrate engagement in learning tasks. These tasks normally are designed and implemented by the teacher in a controlled manner. Students are considered "engaged" when they listen to instruction, demonstrate effort in physical tasks, and participate with interest and enthusiasm. In this environment, students may perceive their teachers to be controlling. Thus, the conflict between teacher control and student autonomy may exist, regardless of how subtle it seems to be. In the following sections, we will discuss our understanding of SDT in relation to the concept of learning in physical education, the learning context, motivated learning behavior, and curriculum implication.

SDT and Learning Theories

Departing from the behaviorist learning theory, constructivist learning theories define learning as a dynamic individual-environment interactive process. These theories share a fundamental assumption that knowledge is constructed actively by individuals or groups. In other words, the constructivist learning theories provide alternative frameworks that reiterate a belief: knowledge and knowing cannot exist without human construction (Alexander, 2005).

Among several schools of constructivism, social constructivism has received the most attention lately in educational research. Social constructivism claims that “learning is a necessary and universal aspect of the process of developing culturally organized, specifically human psychological function” (Vygotsky, 1978, p. 90). In other words, learning occurs when the learner internalizes the social experience of interacting with others. Vygotsky’s concept of ZPD emphasizes the importance of knowledgeable—novice social-interaction in the learning process. Novice learners learn with greater efficiency from interacting with knowledgeable adults and peers. Learning, from this perspective, is a process of psychological function resulting from the individual-social interaction in a given social environment (Vygotsky, 1978). These constructivist ideas are consistent with the SDT’s recognition of the importance of relatedness to learning. Taken both perspectives together, learning is a process where relatedness is both a resource of learning achievement and a need to be satisfied.

Constructivist learning theories share a common notion that learning is an active process where the learner is building new competence based on prior competences by reducing the ZPD. Optimal learning occurs when the learner becomes actively engaged in the cognitive process and uses prior knowledge in the process of social interaction with the knowledgeable others. Thus, competence (especially physical competence), as both a precursor and an outcome, plays a crucial role in learning in physical education (Chen & Ennis, 2009). In fact, not only the actual competence is an important determinant of learning, students’ self-perception of competence is just as critical (Harter, 1985; Corbin, 2002). Thus, inevitably, the need of feeling competent has to be fulfilled for students to be successful in learning.

SDT and Learning in Physical Education

Learning in physical education is defined as a relatively permanent behavioral change resulting from experience of physical movement associated with cognitive understanding of the movement (Rink, 2001). Learning in physical education can be represented by student performance on achievement tests of cognitive knowledge and skills and reflected in terms of in-class physiological intensity (Chen & Ennis, 2004).

As a school subject, physical education emphasizes that students must master a body of disciplinary knowledge that integrates biological-medical sciences, social-psychological sciences, and cultural humanities to achieve the goal of physical education (Chen & Ennis, 2004). Cognitive knowledge and motor skill acquisitions are the central indicators of student learning in physical education. However, in most SDT studies, knowledge and skill acquisitions are not examined as motivational consequences. In these studies, instead of learning, outcomes of physical education were often defined in terms of students’ concentration level (Ntoumanis, 2005; Standage, Duda, & Ntoumanis, 2005), preference to attempt challenging tasks, positive affect (i.e., happy, satisfied, excited, and relaxed) (Standage, et al., 2005) and negative affect (e.g., disappointed, embarrassed, boredom) (Standage, et al., 2005, Ntoumanis, 2001), intention of being physically active after school (Ntoumanis, 2001, 2005; Standage, Duda, & Ntoumanis, 2003a), and effort in physical education (Ntoumanis, 2001).

In a recent study, Sun and Chen (2008) examined the relationship between SDT components and learning in middle school physical education. Data from 242 sixth grade students in 15 middle schools on SDT components, cognitive knowledge gain, and physical skill improvement revealed that amotivation negatively related to students' knowledge gain. None of the SDT motivations, including intrinsic motivation, identified regulation, introjected regulation, and external regulation, was found relating to knowledge and skill gains. Regardless of the absence of the motivation-achievement link, Sun and Chen (2008) reported that the sixth grade students were highly motivated in terms of the SDT constructs. From a learning-centered perspective, motivation should be "linked explicitly to ways of knowing, understanding, and constructing meaning" (Oldfather & Dahl, 1994, p.139). The findings from Sun and Chen's (2008) study suggest that our students may have motivational energy but lack motivational direction toward "knowing, understanding, and constructing meaning" of the physical education content. The issue of lacking motivational direction (achieving learning goals) seems to indicate a need for clearly distinguishing learning goals and nonlearning goals (e.g., having fun) in designing a physical education curriculum (Chen & Ennis, 2004).

SDT and Learning Context

The context in which learning is expected to take place has a direct impact on the level of student motivation and learning achievement. Our pedagogical understanding of SDT reiterates the importance to acknowledge that the learning environment of physical education is controlled by the teacher. During the process of internalizing extrinsic values and desired behavior, students are expected to establish an internal representation of the external controls (Deci & Ryan, 1985; Ryan & Deci, 2000b) and become more likely to engage in an activity without external contingencies, such as rewards, and to be able to monitor their behaviors. However, students' ability to engage, monitor, and regulate is not stable or consistent with learning goals (e.g., having fun vs. practicing to learn). To facilitate the internalization process for optimal motivation, the teacher should provide social support to students (Deci & Ryan, 1985; Ryan & Deci, 2000c). A socially constructive environment enhances social interactions, promotes a sense of belongingness, and stabilizes the relatedness in the classroom. The environment encourages students to adopt adaptive behaviors during learning. But social interaction and adaptive behavior development should not be learning goals in and of themselves. Rather they should serve to help students achieve the learning goal defined in the curriculum.

It has become clear from the social constructivist learning theory (Vygotsky, 1978) that an effective learning environment should not only emphasize relevant social-interaction to help learners master the knowledge, but also *empower* students as constructors of shared meanings and knowledge in the learning process. In this environment, learners become the owners of learning who are able to identify themselves with the desired learning outcome (Pollard, Thiessen, & Filer, 1997). What is not clear is that in a context controlled by teachers, how can the conflict between the controlling and controlled be resolved to maximize the benefits of schooling or learning in physical education? Thus it is extremely important for us to recognize the power of using the extrinsic regulations.

Research findings in physical education indicate that some externally regulated motivation can be enhanced by an overall satisfaction of the three needs. For example, Ntoumanis (2005) and

Standage, Duda, and Ntoumanis (2005) found that the overall need satisfaction positively predict students' introjected motivation. But not all satisfactions contribute equally to externally regulated motivation. For example, it was found that perceived satisfaction of the need for competence related positively to identified and introjected regulations (Ntoumanis, 2001) and that it also predicted intrinsic motivation (Ntoumanis, 2001; Standage, Duda, & Ntoumanis, 2003b). Perceived satisfaction of autonomy was found not contributing to the externally regulated motivations (Ntoumanis, 2001), but contributing to learner intrinsic motivation (Goudas & Biddle, 1994; Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003; Hagger, Chatzisarantis, Barkoukis, & Wang, 2005). Hidi and Harachiewicz (2000) argued, however, to enhance intrinsic motivation by supporting autonomy without helping students develop self-regulations to achieve learning goals (externally regulated goals) may be counter-productive in terms of learning, because the controlling nature of schooling may suppress the possibility of developing true intrinsic motivation associated with learning content. In other words, a genuine interest in content (extrinsic motivation) is difficult to develop without teachers' regulating students' behavior to learn the content first.

Summary

Physical education provides ample experiences for students to develop competence and relatedness. With these experiences their needs for competence and relatedness can be satisfied. Physical education may not be able to provide opportunities to satisfy the need for autonomy due to potential conflict between control and autonomy. Although researchers and physical educators never cease helping students seek personal meaningfulness during their learning process (e.g., Jewett, Bain, & Ennis, 1995; Jewett & Mullan, 1977), this meaning-centered perspective has never been in dominance in mainstream physical education. Based on research on student disengagement in physical education (e.g., Cothran & Ennis, 1999), we are afraid that in many physical education programs the learning experiences are still "something that was done to a child's body to make it stop wriggling and squirming," as criticized nearly 40 years ago (Metheny, 1975, p. 14). On the other hand, what is the meaning of physical education? Who should determine the meaning? Should students be given autonomy to determine the destiny of learning in physical education, even though we physical educators know that sometimes the autonomy may not lead to the destiny? These pedagogically challenging questions directly relate to whether students can be fully autonomous and how much autonomy that they experience can enhance learning achievement.

It is clear that an overall satisfaction of the three innate needs can lead to self-determined motivation in physical education. However, the independent contribution to motivation by satisfying each individual need is not clearly articulated in physical education research. Findings from psychological research indicate that autonomy, rather than relatedness, serves as a driving force for perceived competence and intrinsic motivation. The findings seem to imply an inference that students will learn better by working with high individual autonomy. It is important, then, for future research to clarify contribution of satisfying each innate need to optimal motivation and achievement. The absence of the relatedness function from the current research findings does not seem to give a clear guidance about the extent to which the need for relatedness contributes to learner motivation and learning.

Conclusion: Curriculum Ramifications of SDT

Learning relies heavily on social interactions and cultural influences. Yet, learning cannot take place without individuals' active construction of knowledge. Our understanding is that the central goal of social interactions is to nurture and enhance learning. The social process of learning is foremost a process of internalization (Vygotsky, 1978) where the student actively internalizes the external social and cultural values into his/her own as knowledge is being constructed and stored.

Social constructivists believe that a learning environment with positive social interaction can facilitate students' knowledge construction. Similarly, SDT holds that the internalization is a process in which students interact with peers, teachers, and the content to develop self-determined motivation for learning. SDT views internalization as a constructive process through which individuals transform external attitudes, beliefs, or behavioral regulation into their own values, beliefs, or regulations. In summary, social and cultural factors can promote the internalization of both cognition and motivation and individuals themselves are the center of these processes. Therefore, a curriculum that incorporates both social constructivist learning theory and SDT will be able to navigate students through the controlled learning environment of schooling toward optimal motivation for learning achievement.

Finally, we believe that helping students satisfy the need for competence should be the first priority of physical education. Acknowledging this priority can help us clarify the roles of satisfying the other two needs and accept the legitimacy of using the four self-regulation mechanisms to develop extrinsic motivation initially, then to help nurture intrinsic motivation. We have confidence to believe that students may become intrinsically motivated to learn in a social constructivist curriculum (Oldfather, West, White, & Wilmarth, 1999). To link students' motivation to their construction of knowledge for the optimal learning, we need to first explore how motivation can be generated in a social constructivist curriculum environment. Therefore, it is critical to examine the model of SDT with students' learning in physical education. Such investigation may help us determine possible connection between learning and self-determined motivation in curriculum development and offer strategies that teachers can use to enhance student learning in physical education.

References

- Alexander, P.A. (2005). *Psychology in learning and instruction*. Columbus, OH: Prentice-Hall.
- Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviors in predicting students' engagement in school work. *The British Journal of Educational Psychology*, 72, 261–278.
- Black, A.E., & Deci, E.L. (2000). The effects of instructor's autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education*, 84, 740–756.

- Cameron, J., & Pierce, D.W. (1994). Reinforcement, reward, and intrinsic motivation: A meta-analysis. *Review of Educational Research*, 64, 363–423.
- Carson, R.L., & Chase, M.A. (2009). An examination of physical education teacher motivation from a self-determination theoretical framework. *Physical Education and Sport Pedagogy*, 14, 335–353.
- Chen, S., Chen, A., & Zhu, X. (2009, April). *A meta-analytical study: Are K-12 students motivated in physical education?* Paper presented at the American Educational Research Association annual meeting, San Diego, CA.
- Chen, A., & Ennis, C.D. (2004). Goal, interest, and learning in physical education. *The Journal of Educational Research*, 97, 329–338.
- Chen, A., & Ennis, C.D. (2009). Motivation and achievement in physical education. In K. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school*, Chapter 25 (pp. 553–574). New York: Routledge.
- Connell, J.P. (1991). Context, self and action: A motivation analysis of self-system processes the life-span. In D. Cicchetti & M. Beeghly (Eds.), *The self in transition: Infancy to childhood* (pp. 61–97). Chicago: University of Chicago Press.
- Connell, J.P., & Wellborn, J.G. (1991). Competence, autonomy and relatedness: A motivational analysis of self-system processes. In M.R. Gunnar & L.A. Sroufe (Eds.), *Minnesota symposium on child psychology* (Vol. 22, pp. 43–77). Hillsdale, NJ: Erlbaum.
- Corbin, C.B. (2002). Physical activity for everyone: What every physical educator should know about promoting lifelong physical activity. *Journal of Teaching in Physical Education*, 21, 128–144.
- Corbin, C.B., Le Masurier, G.L., & Lambdin, D. (2007). *Fitness for life middle school* (5th ed.). Champaign, IL: Human Kinetics.
- Cothran, D.J., & Ennis, C.D. (1999). Alone in a crowd: Meeting students' needs for relevance and connection in urban high school physical education. *Journal of Teaching in Physical Education*, 18, 234–247.
- Dahlberg, G., Moss, P., & Pence, A. (1999). *Beyond quality in early childhood education and care: Postmodern perspective*. London: Falmer Press.
- Deci, E.L., Eghrari, H., Patrick, B.C., & Leone, D.R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality*, 62, 119–142.
- Deci, E.L., Koestner, R., & Ryan, R.M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125, 627–668.

- Deci, E.L., & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E.L., & Ryan, R.M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227–268.
- Deci, E.L., & Ryan, R.M. (2002). Overview of self-determination theory: An organismic dialectical perspective. In E.L. Deci & R.M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3–36). University of Rochester Press.
- Feldman, S.S., & Wentzel, K.R. (1990). Relations among family interaction patterns, classroom self-restraint, and academic achievement in preadolescent boys. *Journal of Educational Psychology*, 82, 813–819.
- Fleer, M., & Richardson, C. (2009). Cultural-historical assessment: Mapping the transformation of understanding. In A. Anning, J. Cullen, & M. Fleer (Eds.), *Early childhood education: Society and culture* (2nd ed., pp. 130–145). London: SAGE Publications.
- Goodlad, J. (2000). Education and democracy: Advancing the agenda (online version). *Phi Delta Kappan*, 86, 86–89.
- Goudas, M., & Biddle, S. (1994). Perceived motivational climate and intrinsic motivation in school physical education classes. *European Journal of Psychology of Education*, 9, 241–250.
- Grolnick, W., Gurland, S., Jacob, J., & Decourcey, W. (2001). The development of self-determination in middle childhood and adolescence. In A. Wigfield & J. Eccles (Eds.), *Development of achievement motivation* (pp. 148–171). San Diego, CA: Academic Press.
- Hagger, M.S., Chatzisarantis, N.L.D., Barkoukis, V., & Wang, C.K.J. (2005). Perceived autonomy support in physical education and leisure-time physical activity: A cross-cultural evaluation of the trans-contextual model. *Journal of Educational Psychology*, 97, 376–390.
- Hagger, M.S., Chatzisarantis, N.L.D., Culverhouse, T., & Biddle, S.J.H. (2003). The processes by which perceived autonomy support in physical education promotes leisure-time physical activity intentions and behavior: A trans-contextual model. *Journal of Educational Psychology*, 95, 784–795.
- Harter, S. (1985). Competence as a dimension of self-evaluation: Toward a comprehensive model of self-worth. In R.E. Leahy (Ed.), *The development of the self* (pp. 55–121). Orlando, FL: Academic Press.
- Hidi, S., & Harachiewicz, J.M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research*, 70, 151–179.

- Jacobs, J., Lanza, S., Osgood, D.W., Eccles, J., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development*, 73, 509–527.
- Jewett, A.E., Bain, L.L., & Ennis, C.D. (1995). *The curriculum process in physical education*. Madison, WI: Brown & Benchmark.
- Jewett, A.E., & Mullan, M.R. (1977). *Curriculum design: purpose and processes in physical education teaching-learning*. Washington, DC: American Alliance for Health, Physical Education, and Recreation
- John-Steiner, V., & Mahn, H. (1996). Sociocultural approaches to learning and development: A Vygotskian framework. *Educational Psychologist*, 31, 191–206.
- Kage, M., & Namiki, H. (1990). The effects of evaluation structure on children's intrinsic motivation and learning. *Japanese Journal of Educational Psychology*, 38, 36–45.
- Metheny, E. (1975). *Moving and knowing in sport, dance, physical education: A collection of speeches*. Palo Alto, CA: Peek Publications.
- Miserandino, M. (1996). Children who do well in school: Individual differences in perceived competence and autonomy in above-average children. *Journal of Educational Psychology*, 88, 203–214.
- Mitchell, S.A., Oslin, J.L., & Griffin, L.L. (2006). *Teaching sport concepts and skills: A tactical games approach* (2nd ed.). Champaign, IL: Human Kinetics.
- National Association for Sport and Physical Education [NASPE] (2004). *Moving into the future: National standards for physical education* (2nd ed.) Reston, VA: Author.
- Ntoumanis, N. (2001). A self-determination approach to the understanding of motivation in physical education. *The British Journal of Educational Psychology*, 71, 225–242.
- Ntoumanis, N. (2005). A prospective study of participation in optional school physical education using a self-determination theory framework. *Journal of Educational Psychology*, 97, 444–453.
- Oldfather, P., & Dahl, K. (1994). Toward a social constructivist reconceptualization of intrinsic motivation for literacy learning. *JRB: A journal of Literacy*, 28, 139–158.
- Oldfather, P., West, J., White, J., & Wilmarth, J. (1999). *Learning through children's eyes: Social constructivism and the desire to learn*. Washington, D.C.: American Psychological Association.

- Pollard, A., Thiessen, D., & Filer, A. (1997). *Children and their curriculum: The perspectives of primary and elementary school children*. London: Falmer.
- Reeve, J., Nix, G., & Hamm, D. (2003). Testing models of the experience of self-determination in intrinsic motivation and the conundrum of choice. *Journal of Educational Psychology*, 95, 375–392.
- Rink, J.E. (2001). Investigating the assumptions of pedagogy. *Journal of Teaching in Physical Education*, 20, 112–128.
- Rink, J.E. (2009). *Teaching physical education for learning*. Columbus, OH: The McGraw-Hill Companies.
- Ryan, R.M., & Connell, J.P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, 57, 749–761.
- Ryan, R.M., & Deci, E. (2000a). Intrinsic and extrinsic motivation: Classic definitions and new directions. *Contemporary Educational Psychology*, 25, 54–67.
- Ryan, R.M., & Deci, E.L. (2000b). Self-determination theory and the facilitation of intrinsic, social development, and well-being. *The American Psychologist*, 55(1), 68–78.
- Ryan, R.M., & Deci, E.L. (2000c). When rewards compete with nature: The undermining of intrinsic motivation and self-regulation. In C. Sansone & J.M. Harackiewicz (Eds.), *Intrinsic and Extrinsic Motivation: The search for optimal motivation and performance* (pp. 14–56). San Diego, CA: Academic Press.
- Ryan, R.M., & Deci, E.L. (2009). Promoting self-determined school engagement: Motivation, learning, and well-being. In K.R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school*. New York: Routledge.
- Ryan, R.M., & Powelson, C.L. (1991). Autonomy and relatedness as fundamental to motivation and education. *Journal of Experimental Education*, 60(1), 49–66.
- Shen, B., McCaughtry, N., Martin, J., & Fahlman, M.M. (2009). Effects of teacher autonomy support and students' autonomous motivation on learning in physical education. *Research Quarterly for Exercise and Sport*, 80, 44–53.
- Standage, M., Duda, J.L., & Ntoumanis, N. (2003a). A model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. *Journal of Education & Psychology*, 95, 97–110.

- Standage, M., Duda, J.L., & Ntoumanis, N. (2003b). Predicting motivational regulations in physical education: The interplay between dispositional goal orientations, motivational climate and perceived competence. *Journal of Sports Sciences*, 21, 631–647.
- Standage, M., Duda, J.L., & Ntoumanis, N. (2005). A test of self-determination theory in school physical education. *The British Journal of Educational Psychology*, 75, 411–433.
- Sun, H., & Chen, A. (2008). Motivated but Rarely Achieving: An Examination of 6th Graders' Self-Determined Motivation and Learning in Physical Education. Paper presented at American Education Research Association, New York, NY.
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Wentzel, K.R. (1997). Student motivation in middle school: The role of perceived pedagogical caring. *Journal of Educational Psychology*, 89, 411–419.
- Wentzel, K.R. (1999). Social-motivational processes and interpersonal relationships: Implications for understanding students' academic success. *Journal of Educational Psychology*, 91, 76–97.
- Wentzel, K.R. (2002). Are effective teachers like good parents? Teaching styles and student adjustment in early adolescence. *Child Development*, 73, 287–301.
- Wentzel, K.R., & Watkins, D.E. (2002). Peer relationships and collaborative learning as contexts for academic enablers. *School Psychology Review*, 31, 366–377.
- Williams, G.C., & Deci, E.L. (1996). Internalization of biopsychosocial values by medical students. *Journal of Personality and Social Psychology*, 70, 767–779.
- Xiang, P., McBride, R., & Guan, J. (2004). Children's motivation in elementary physical education: a longitudinal study. *Research Quarterly for Exercise and Sport*, 75, 71–80.
- Xiang, P., McBride, R., Guan, J., & Solmon, M. (2003). Children's motivation in elementary physical education: An expectancy-value model of achievement choice. *Research Quarterly for Exercise and Sport*, 74, 25–35.
- Zhu, X., Chen, A., & Sun, H. (2008). Expectancy value, knowledge, and skill in middle school physical education. *Research Quarterly for Exercise and Sport*, 79(1, Supplement) 71.